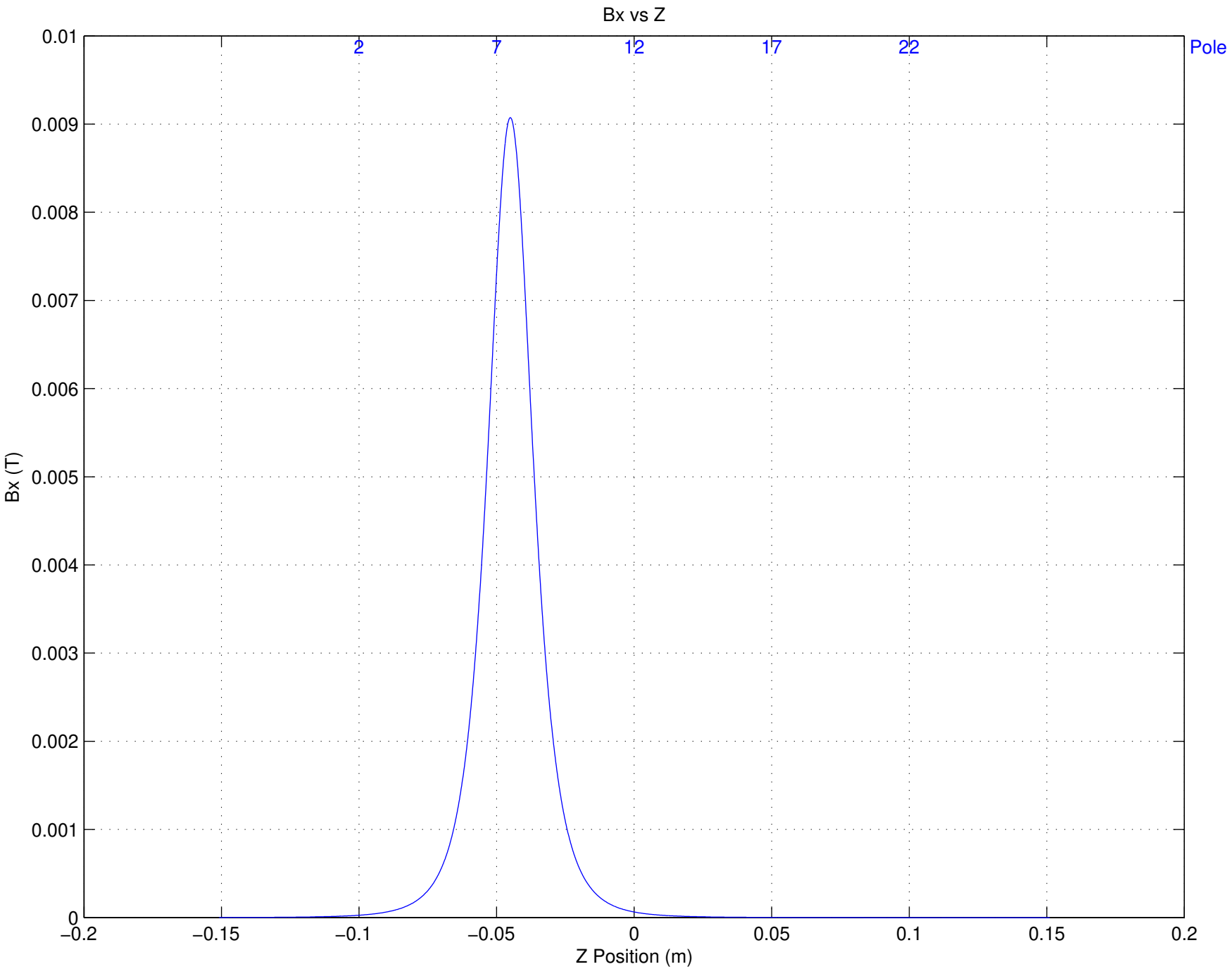
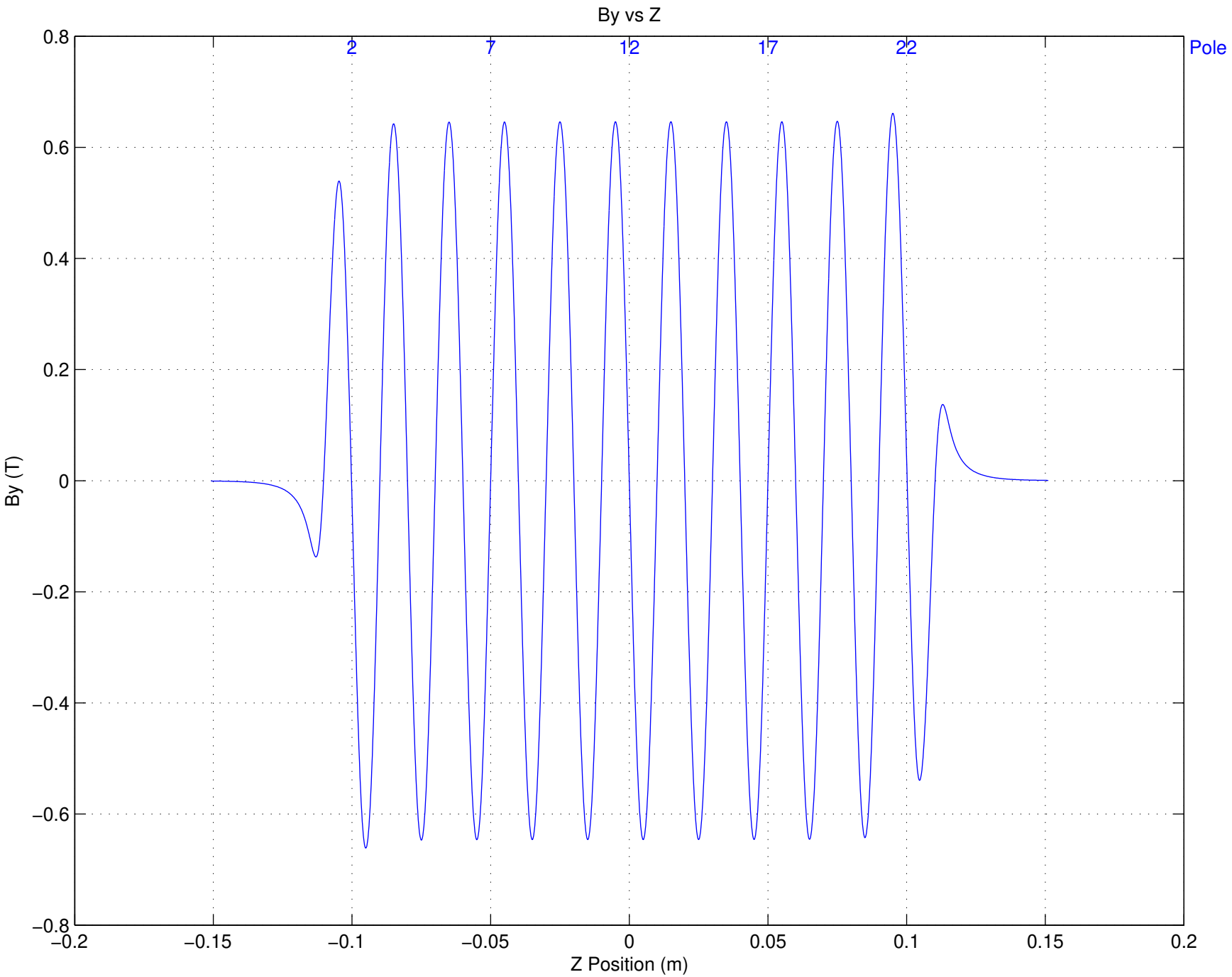
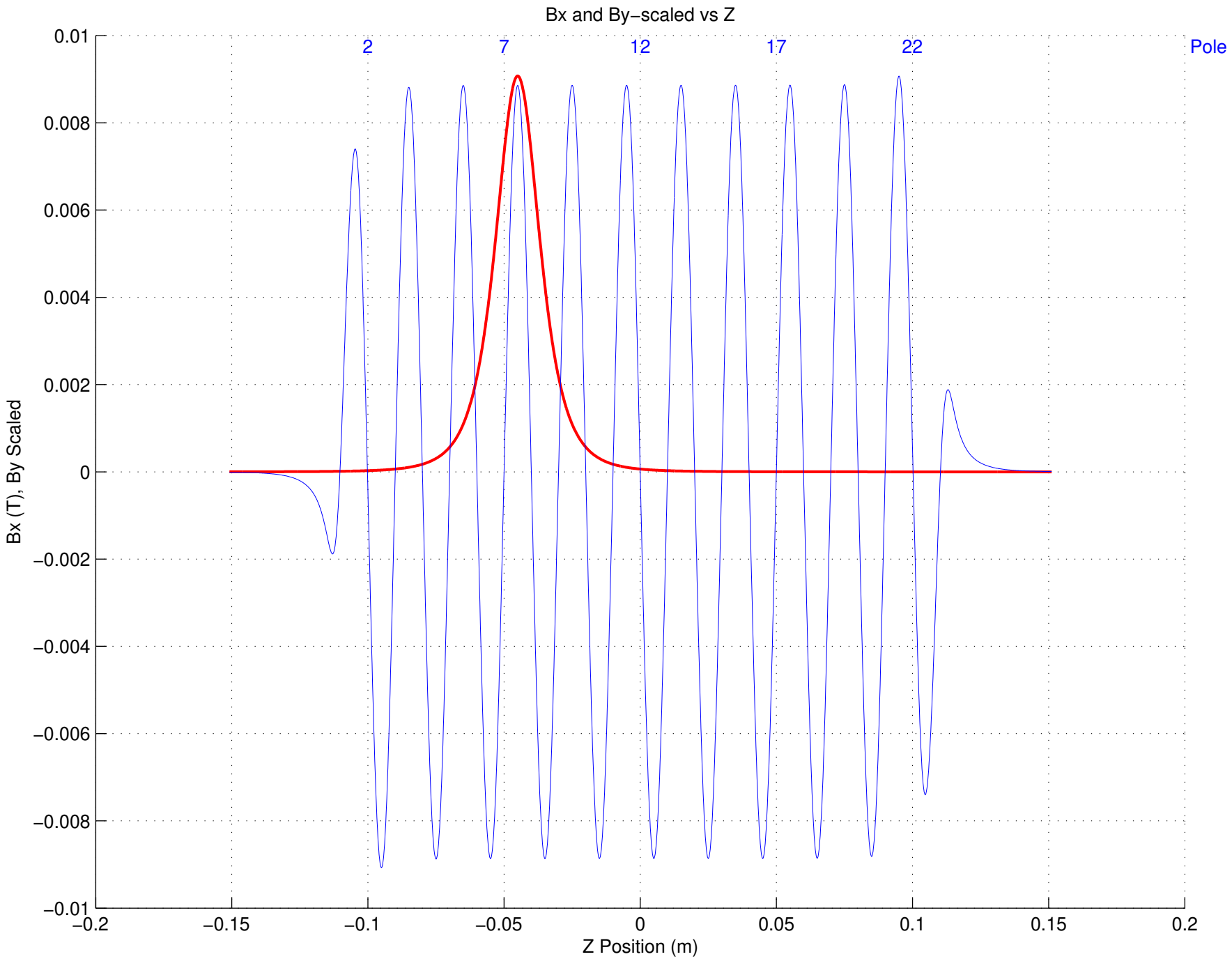
SLAC Magnetic Measurements

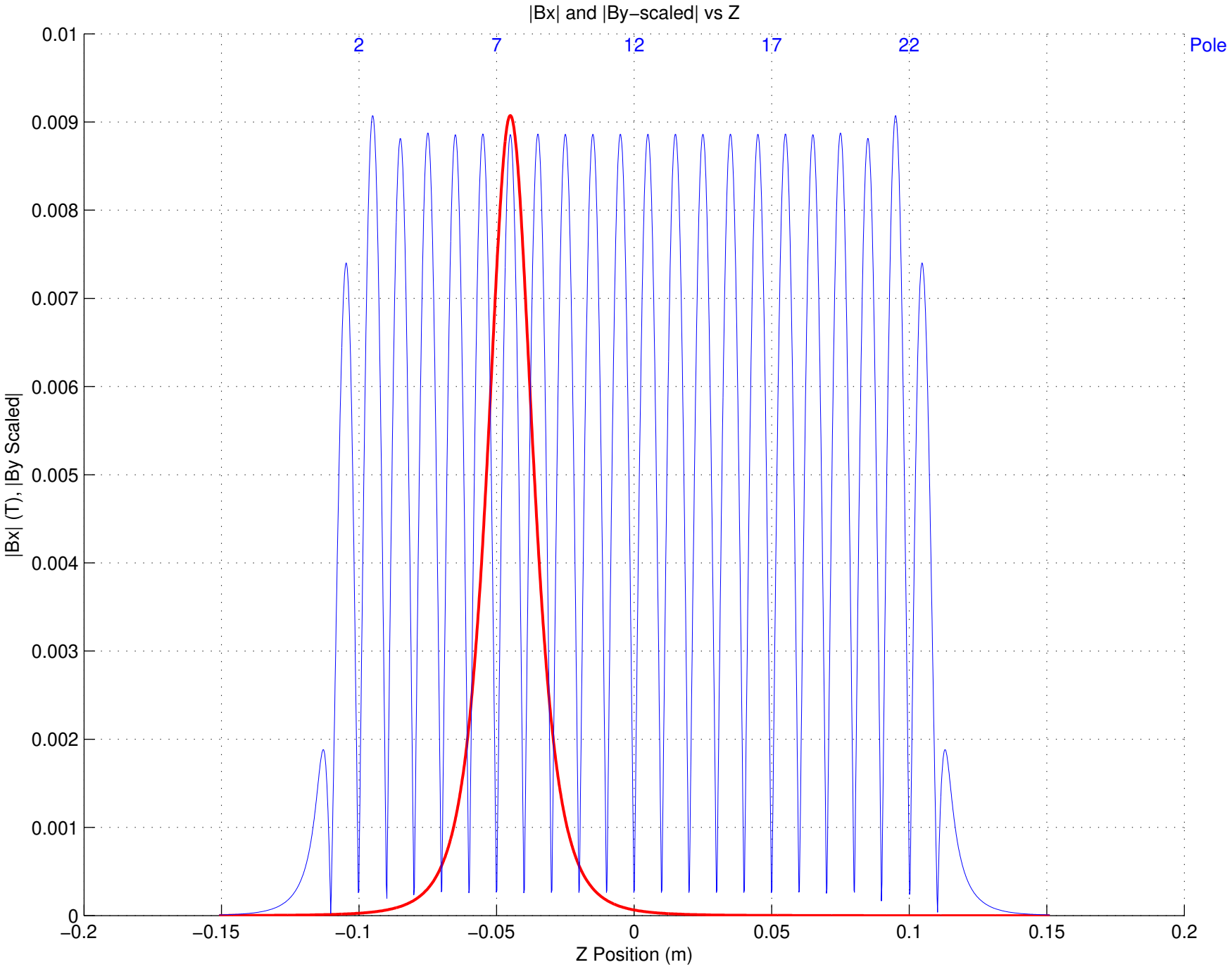
Planar Insertion Device Analysis

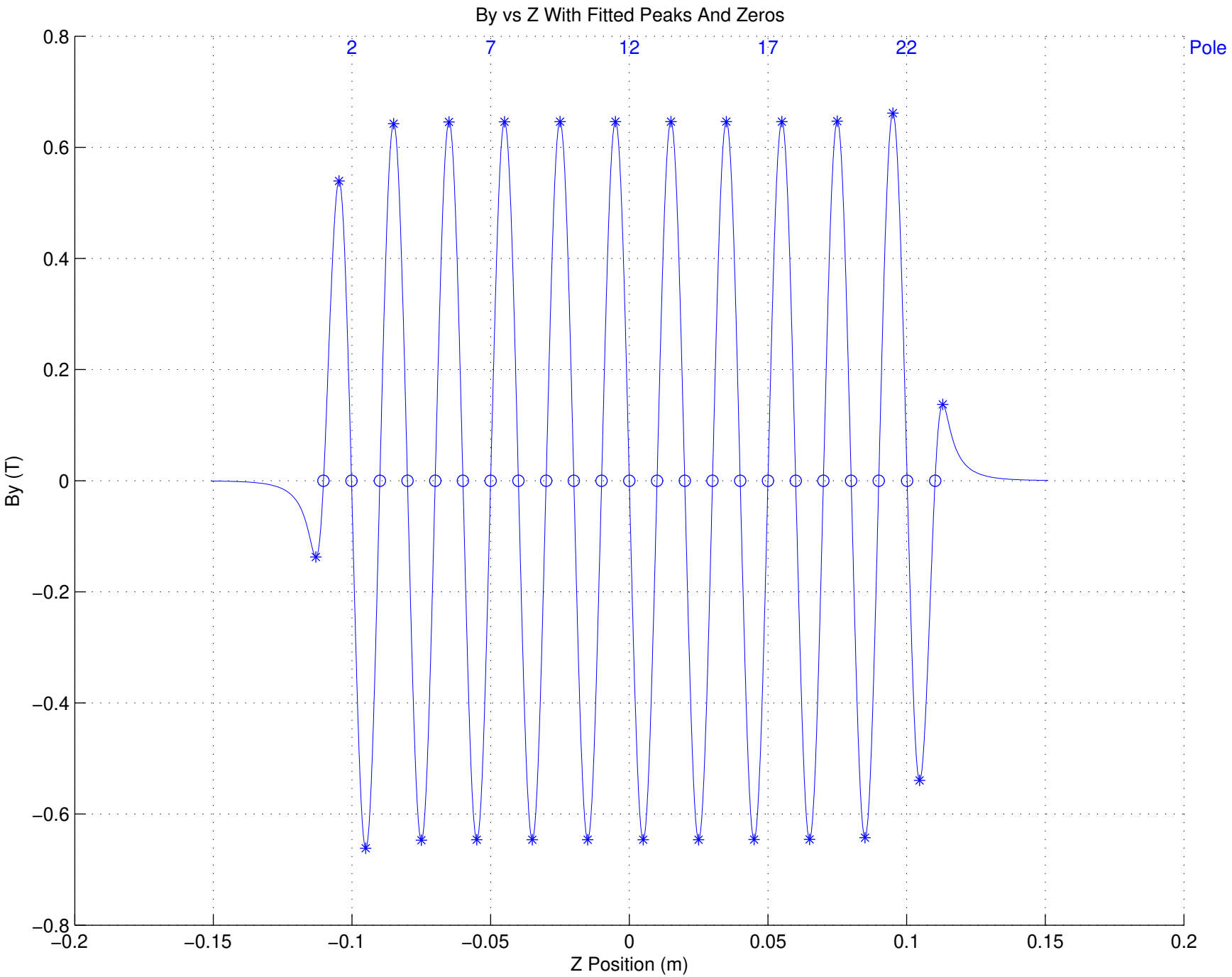
Parameters:
INPUT−FILE−DIR =C:\Magdata\Echo7 U20 Sim\Pole8 shift+−1mm\
INPUT−FILE−NAME =ppm−und−sim.dat
INPUT−FILE−TYPE =ZBXYH
CORR−REQUIRED =0
GAMMA =233.3175
NOM−LAMBDA−U =0.02
NOM−K−VALUE =1.8016
NOM−LAMBDA−R =4.8182e−007
NUM−POLES =24
NUM−END−POLES =3
CELL−LENGTH =0.17

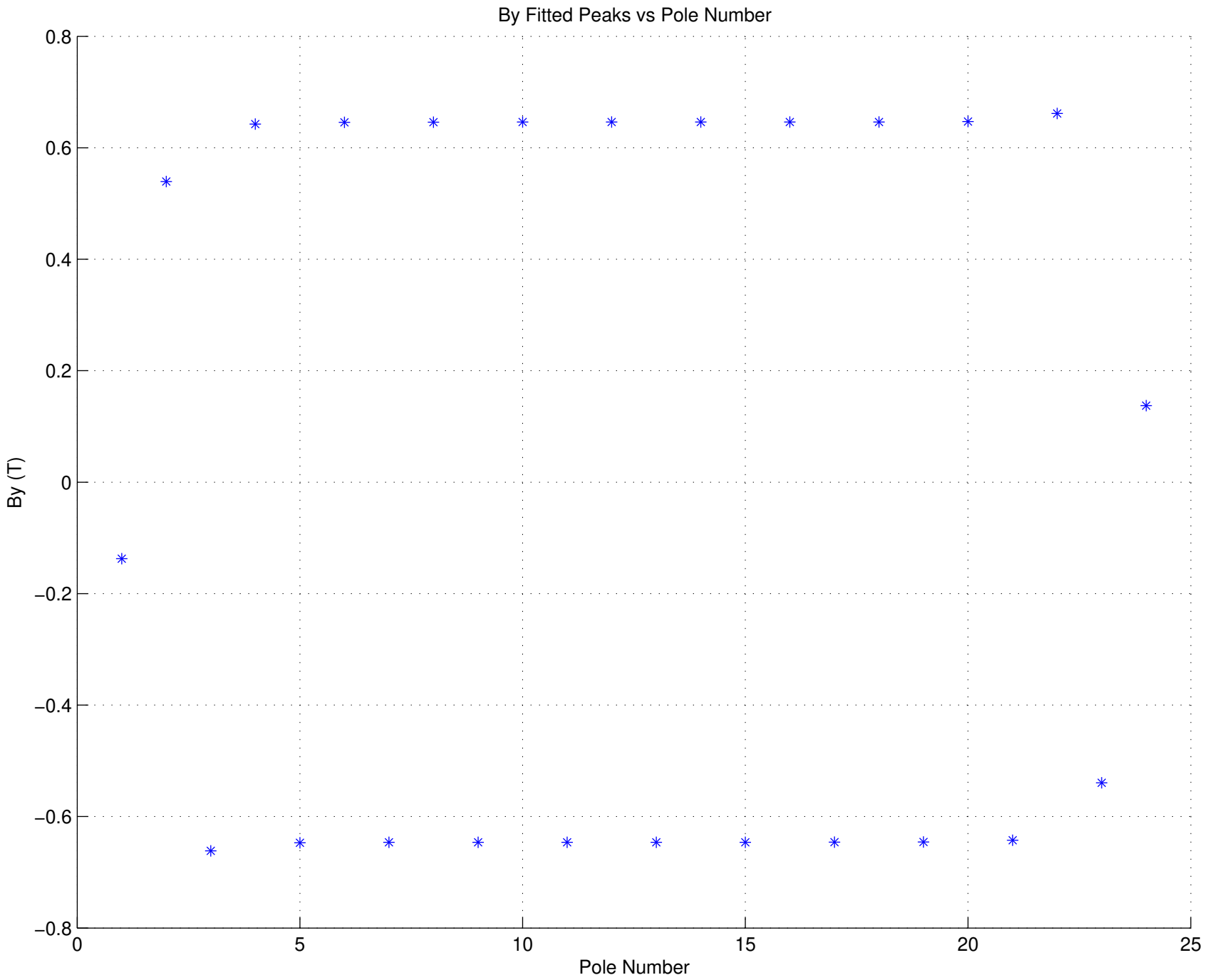

Bx vs Z
Pole
2
7
12
17
22
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
Bx (T)
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
Z Position (m)

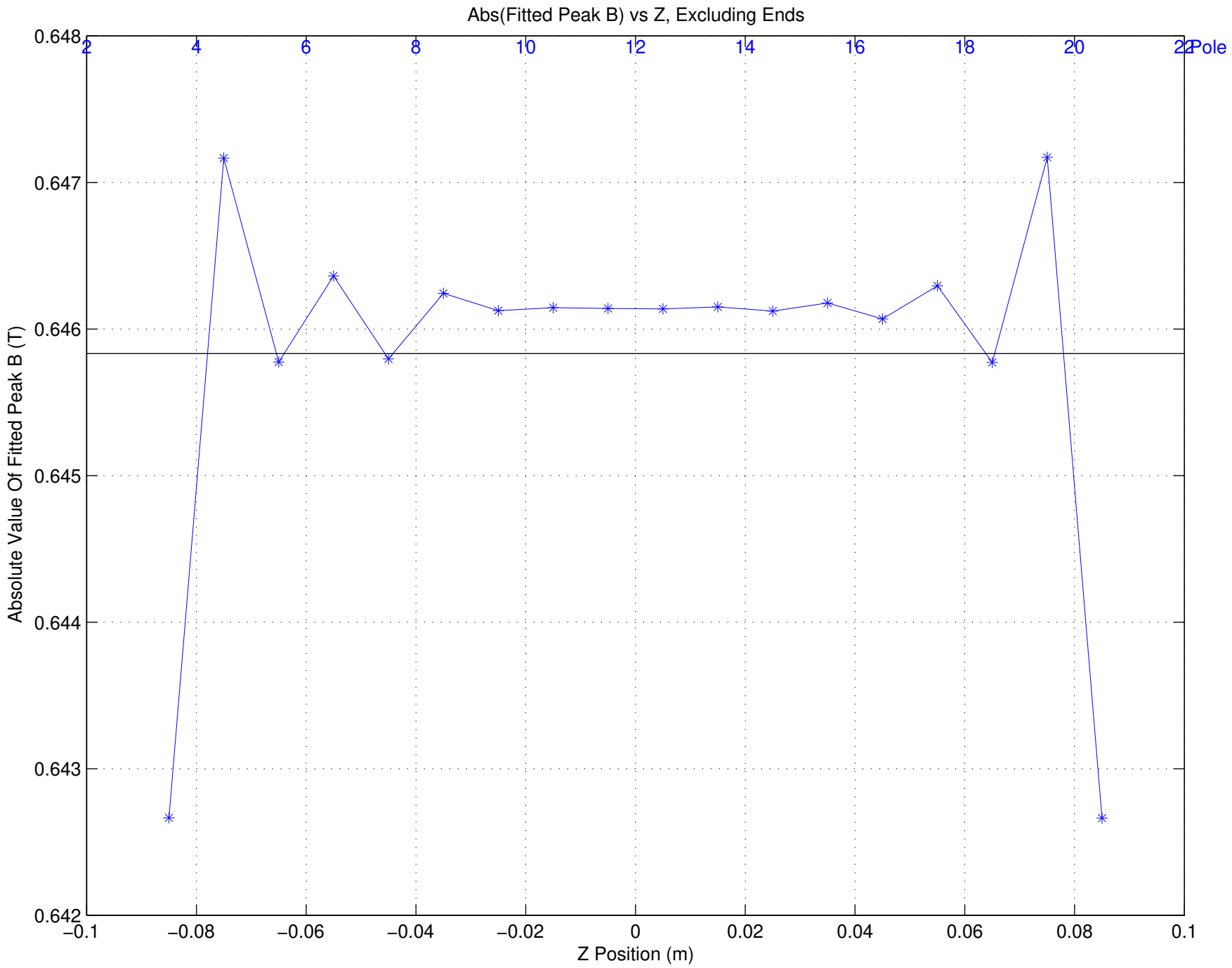

By vs Z
2
7
12
17
22
Pole
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
By (T)
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
Z Position (m)


Bx and By−scaled vs Z
2
7
12
17
22
Pole
0.01
0.008
0.006
0.004
0.002
0
−0.002
−0.004
−0.006
−0.008
−0.01
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
Bx (T), By Scaled
Z Position (m)

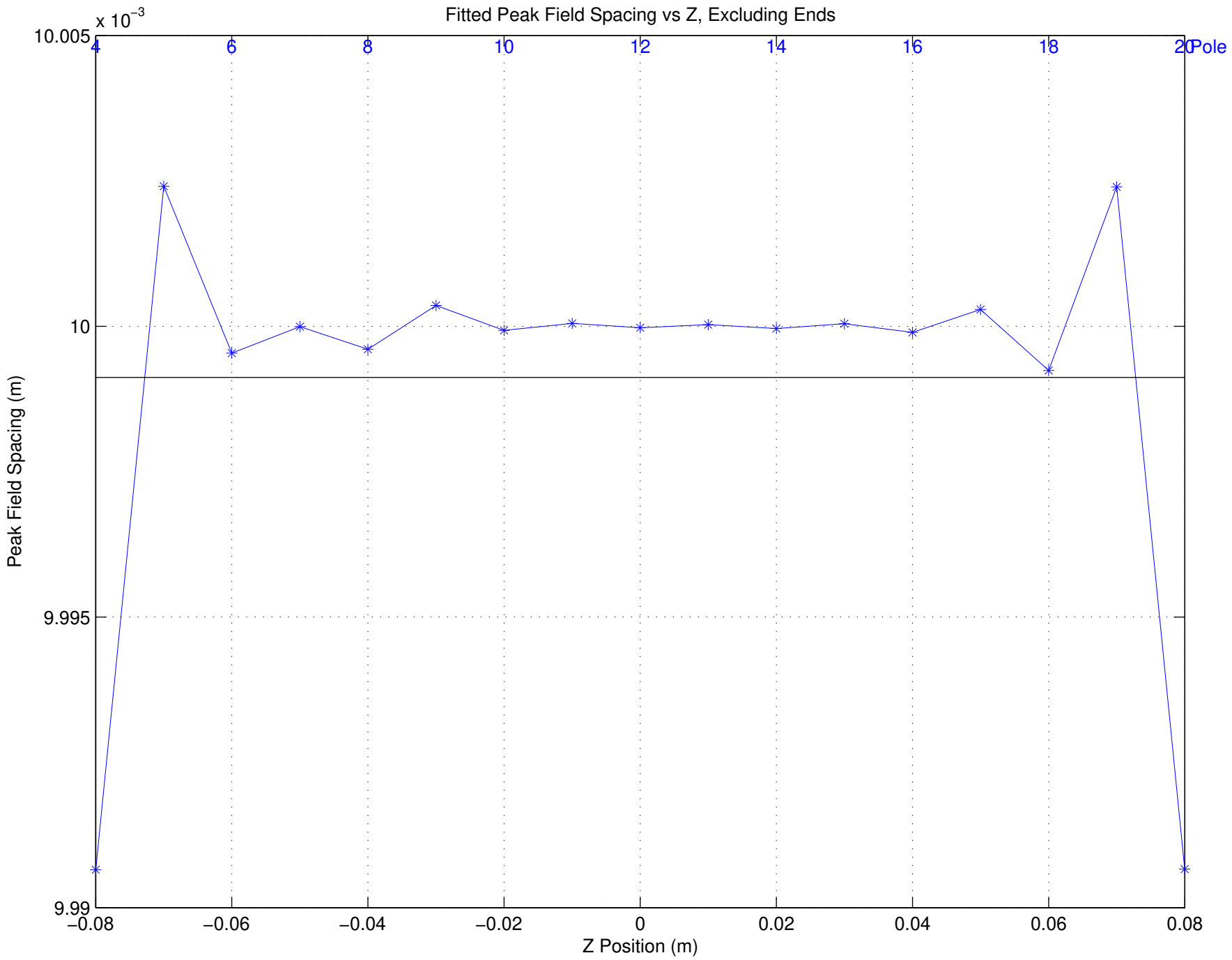

|Bx| and |By−scaled| vs Z
2
7
12
17
22
Pole
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
|Bx| (T), |By Scaled|
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
Z Position (m)


By vs Z With Fitted Peaks And Zeros
2
7
12
17
22
Pole
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
By (T)
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
Z Position (m)

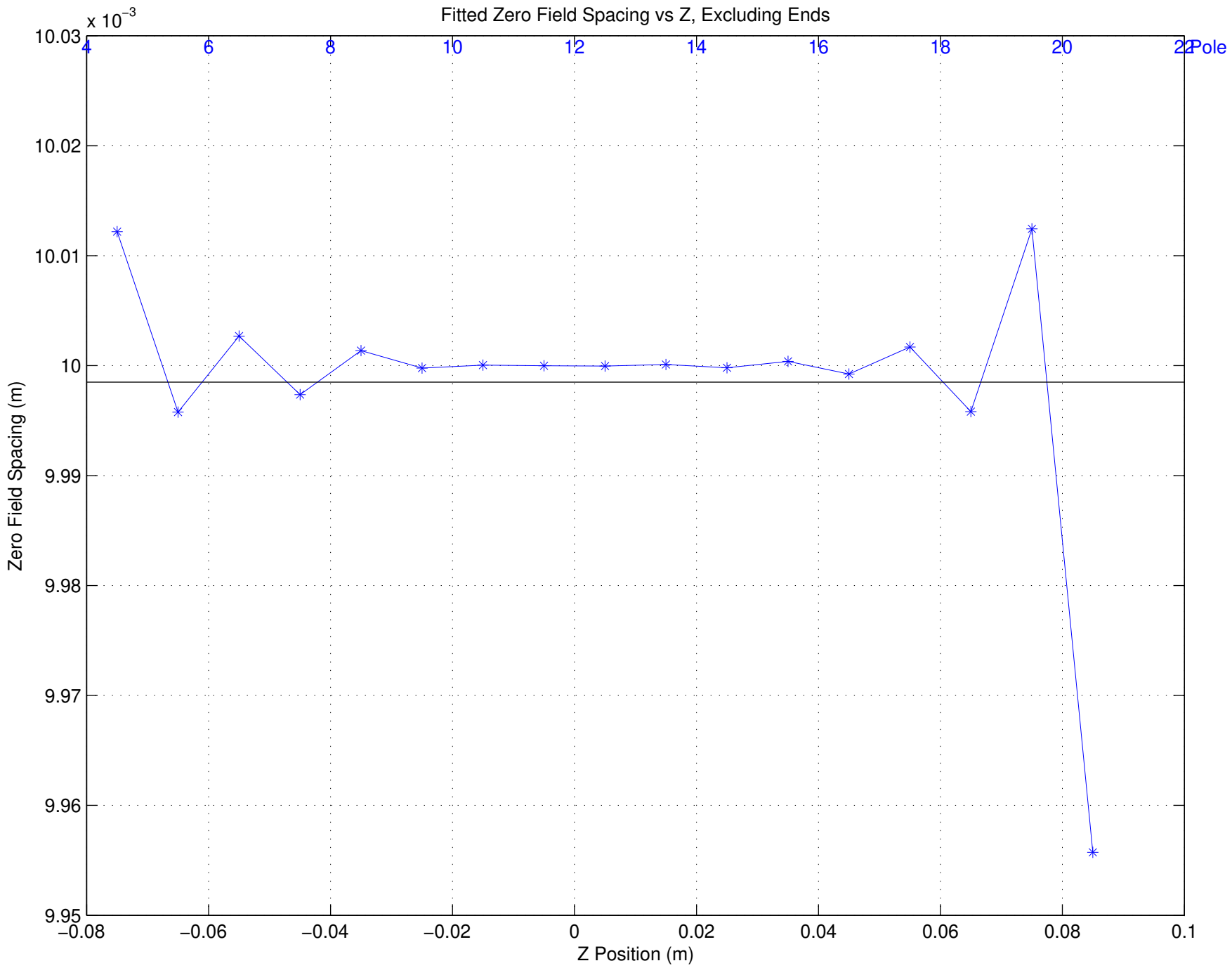

By Fitted Peaks vs Pole Number
By (T)
Pole Number
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
0
5
10
15
20
25



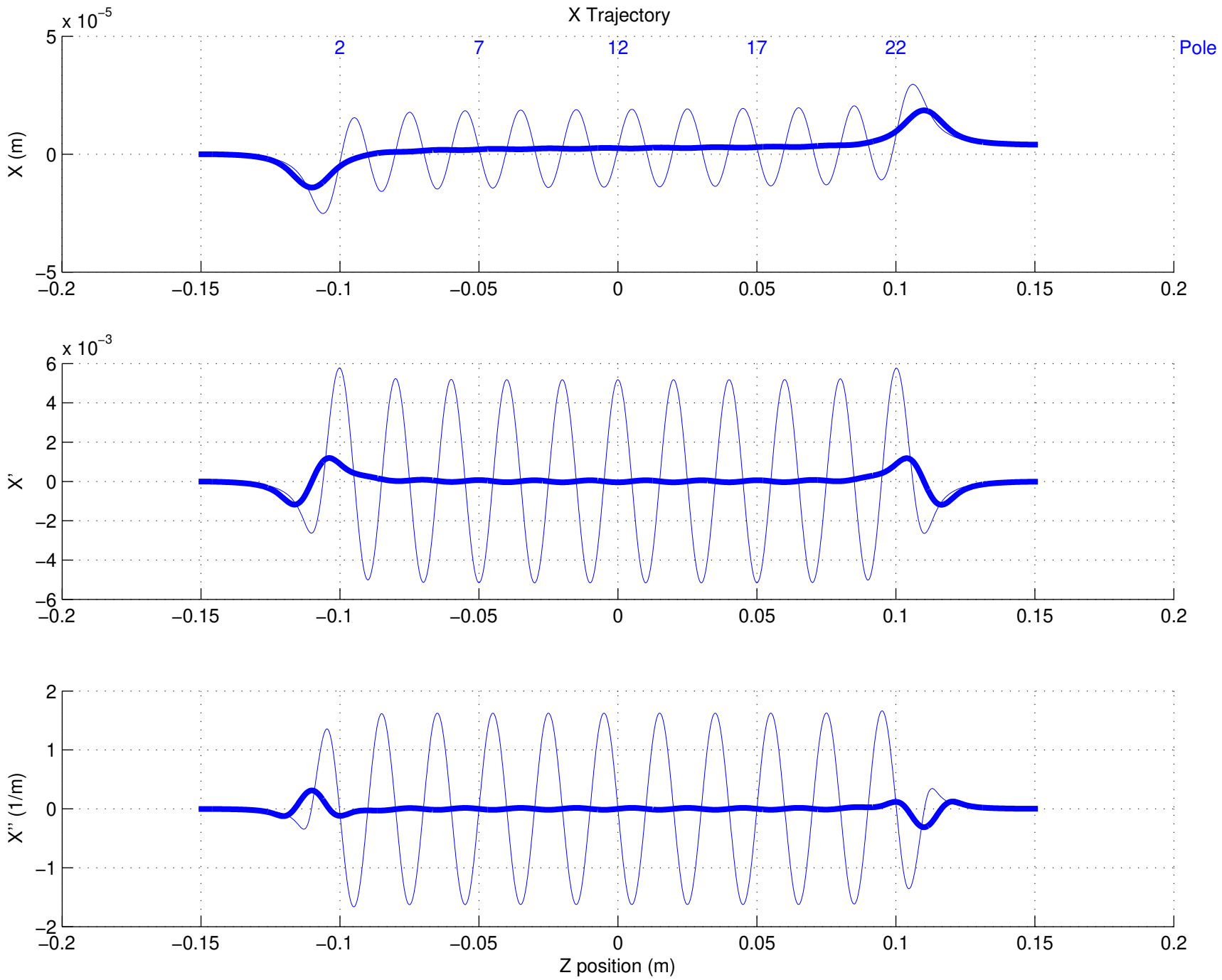
Peak Fields: Ave = 0.645832 T, RMS = 0.001214 T

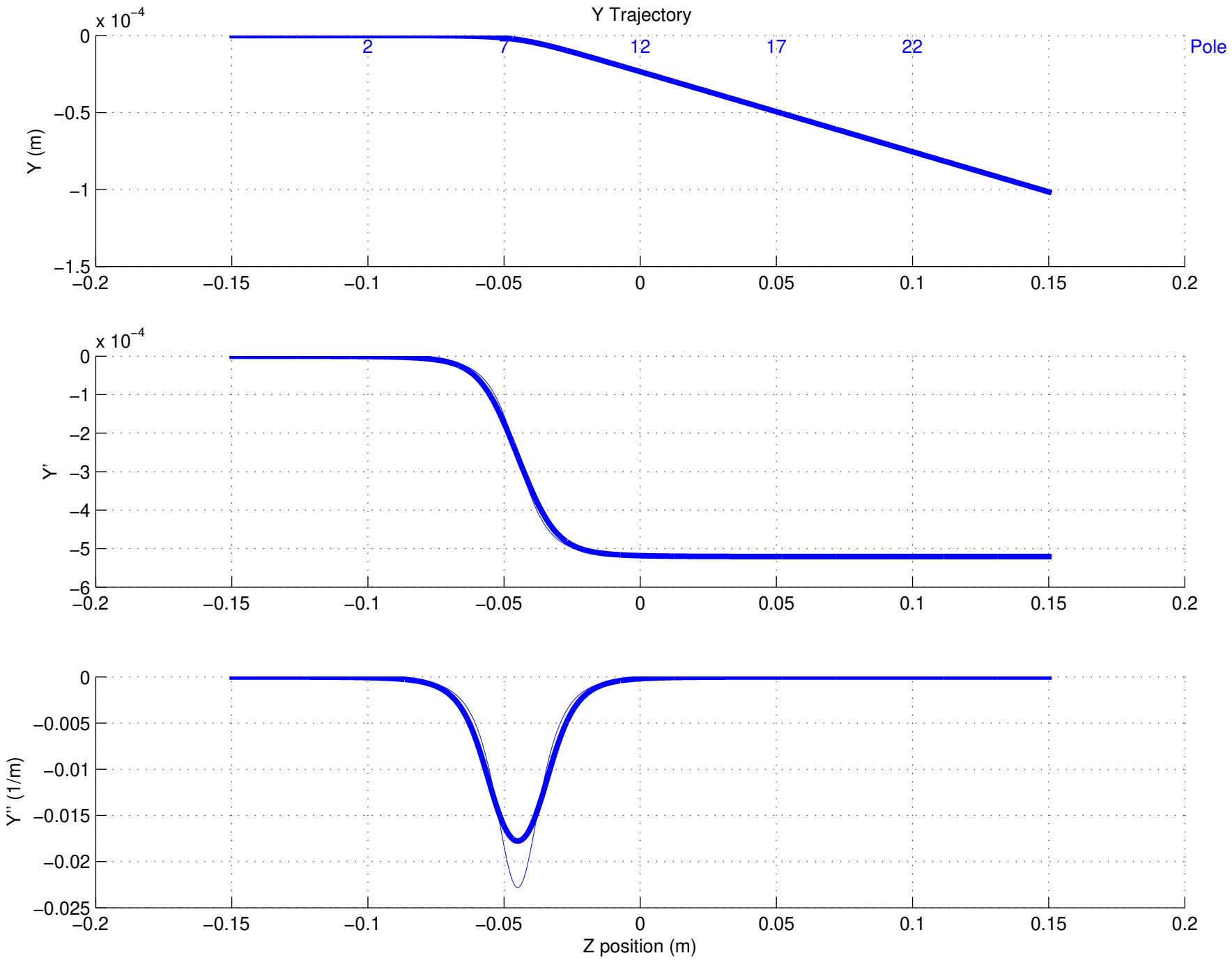


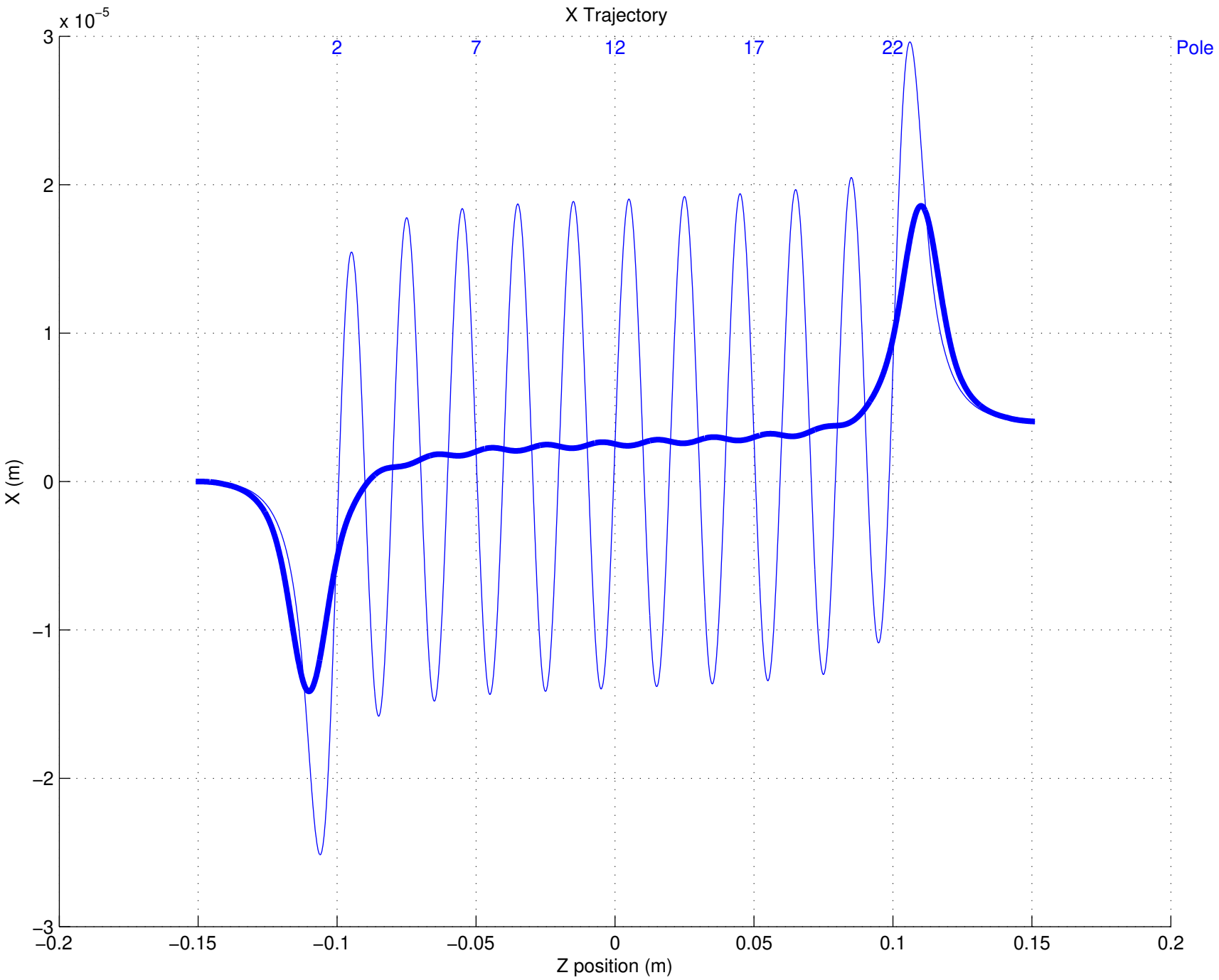
Peak Field Spacing: Ave = 0.009999 m, RMS = 0.000003 m

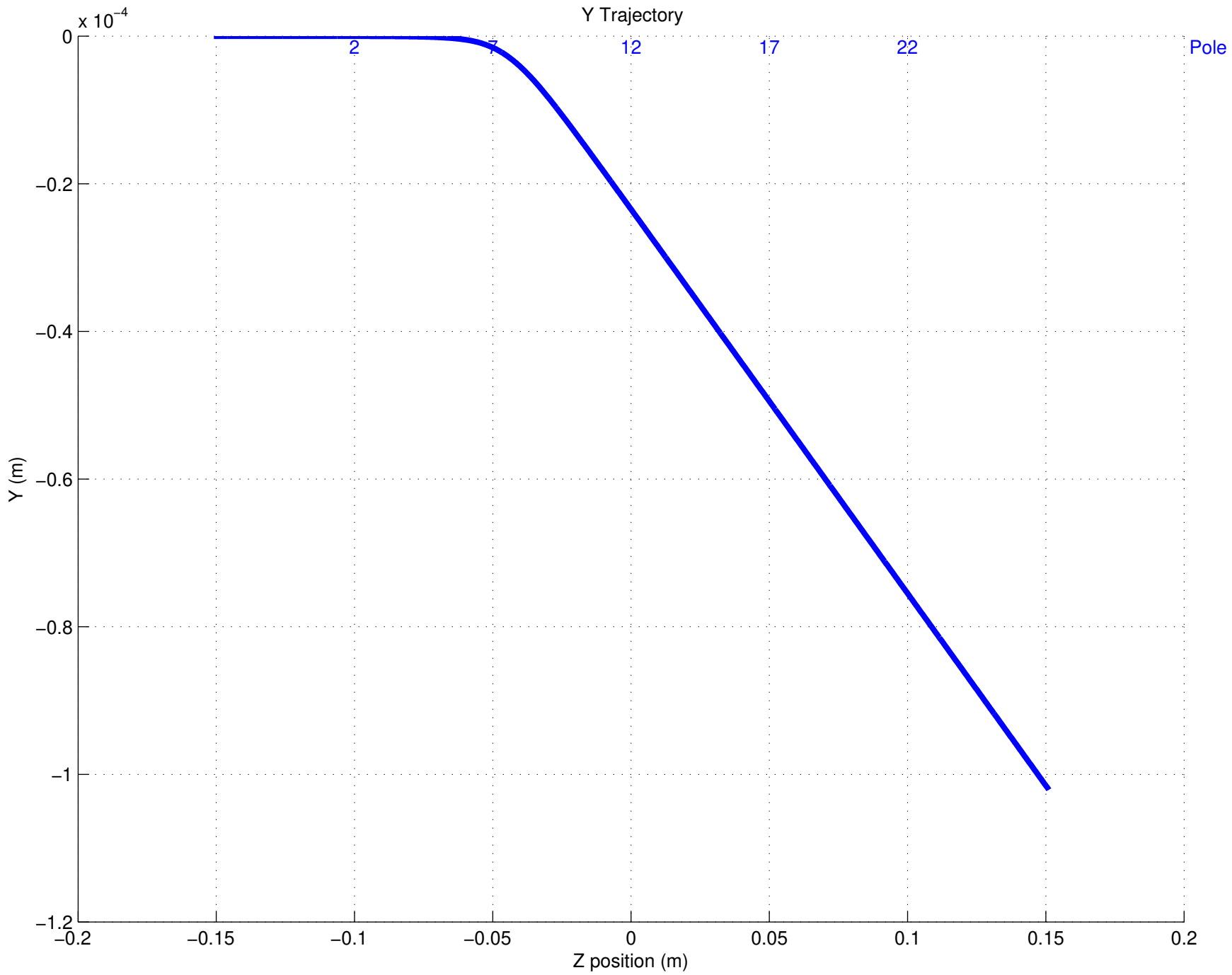


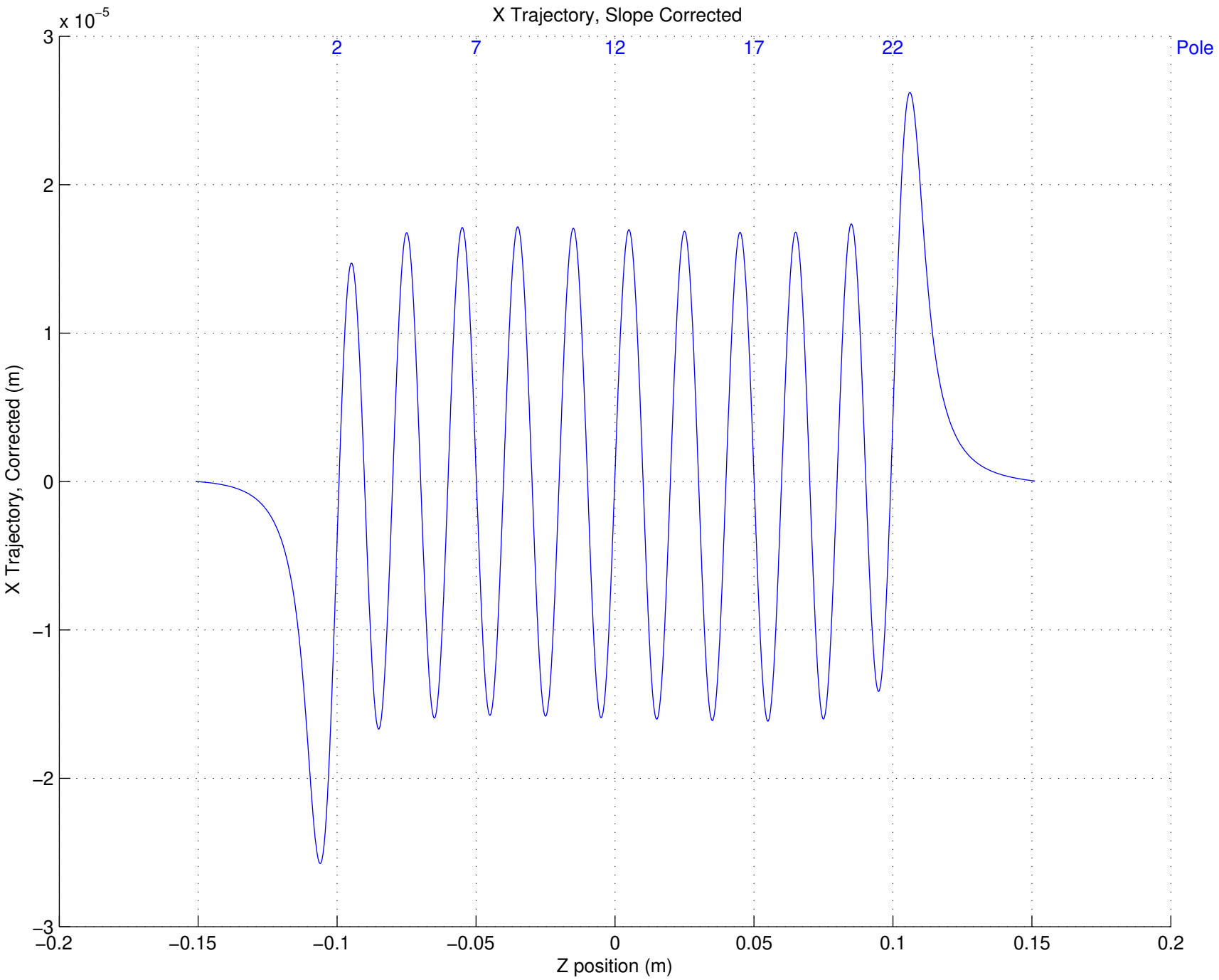
Zero Field Spacing: Ave = 0.009998 m, RMS = 0.000012 m

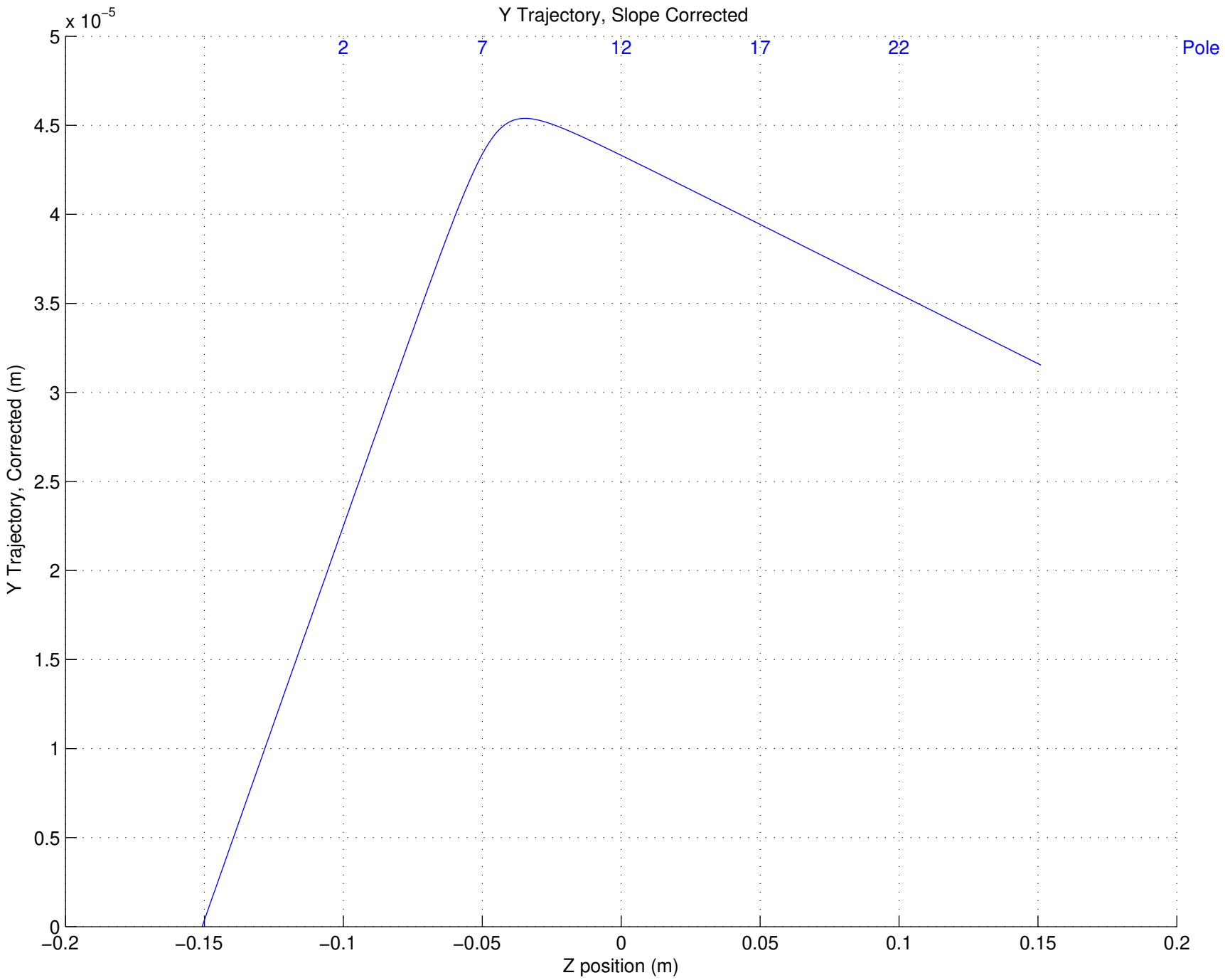

X Trajectory
x 10^-5
5
0
−5
X (m)
2
7
12
17
22
Pole
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
x 10^-3
6
4
2
0
−2
−4
−6
X'
2
1
0
−1
−2
X'' (1/m)
Z position (m)

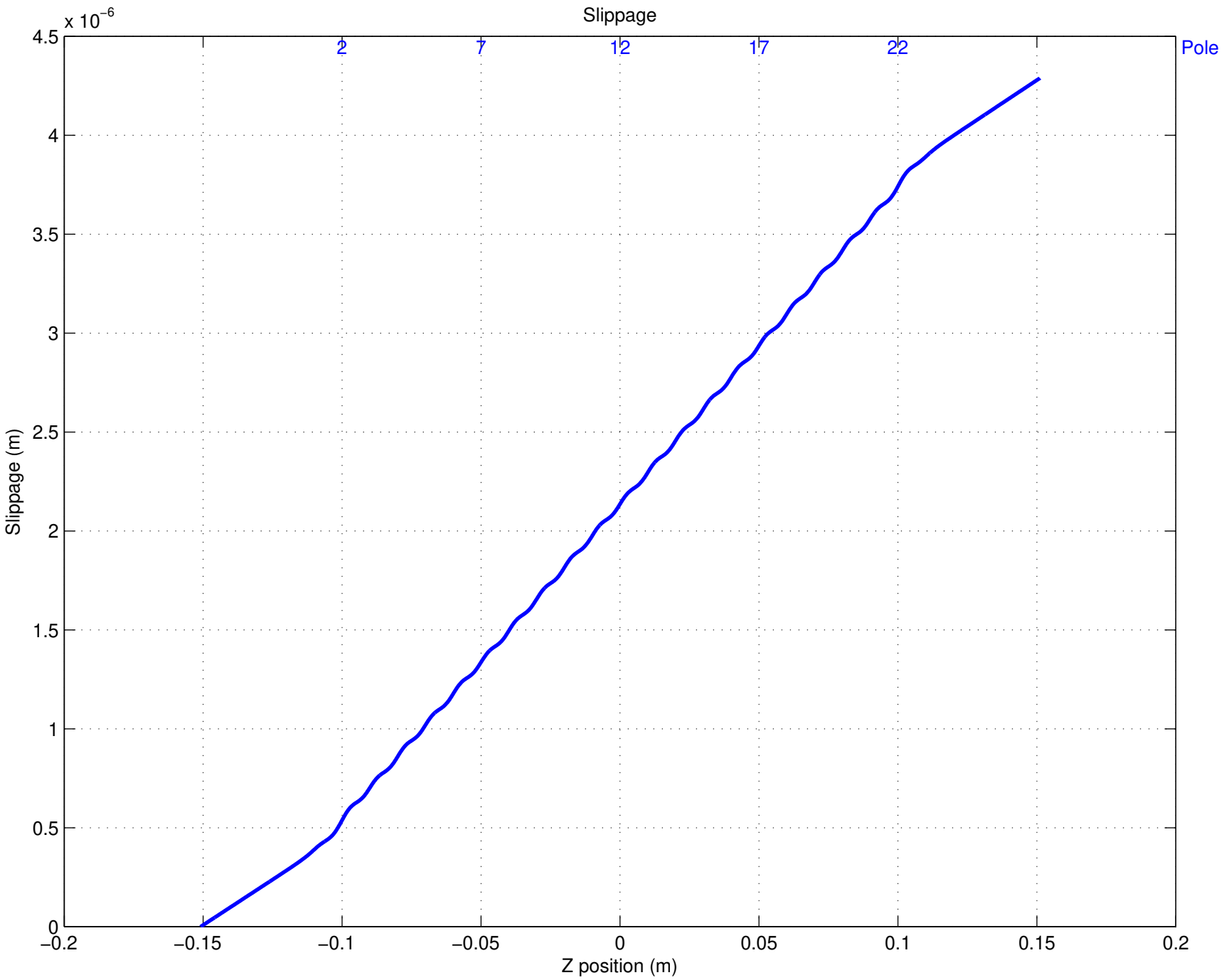

Y Trajectory
x 10^-4
Y (m)
2
7
12
17
22
Pole
Y'
Y'' (1/m)
Z position (m)

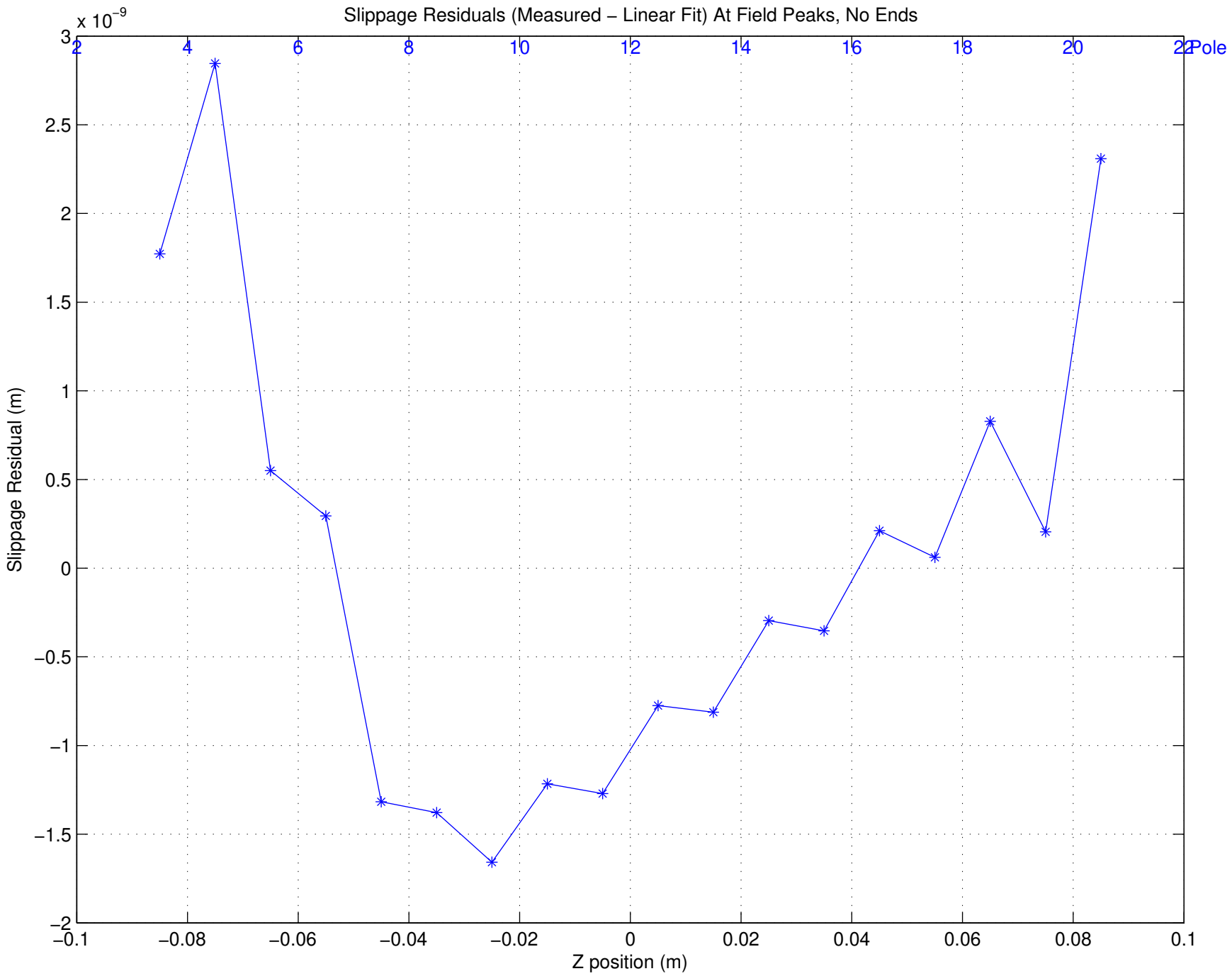

X Trajectory
x 10^-5
3
2
1
0
−1
−2
−3
X (m)
2
7
12
17
22
Pole
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
Z position (m)

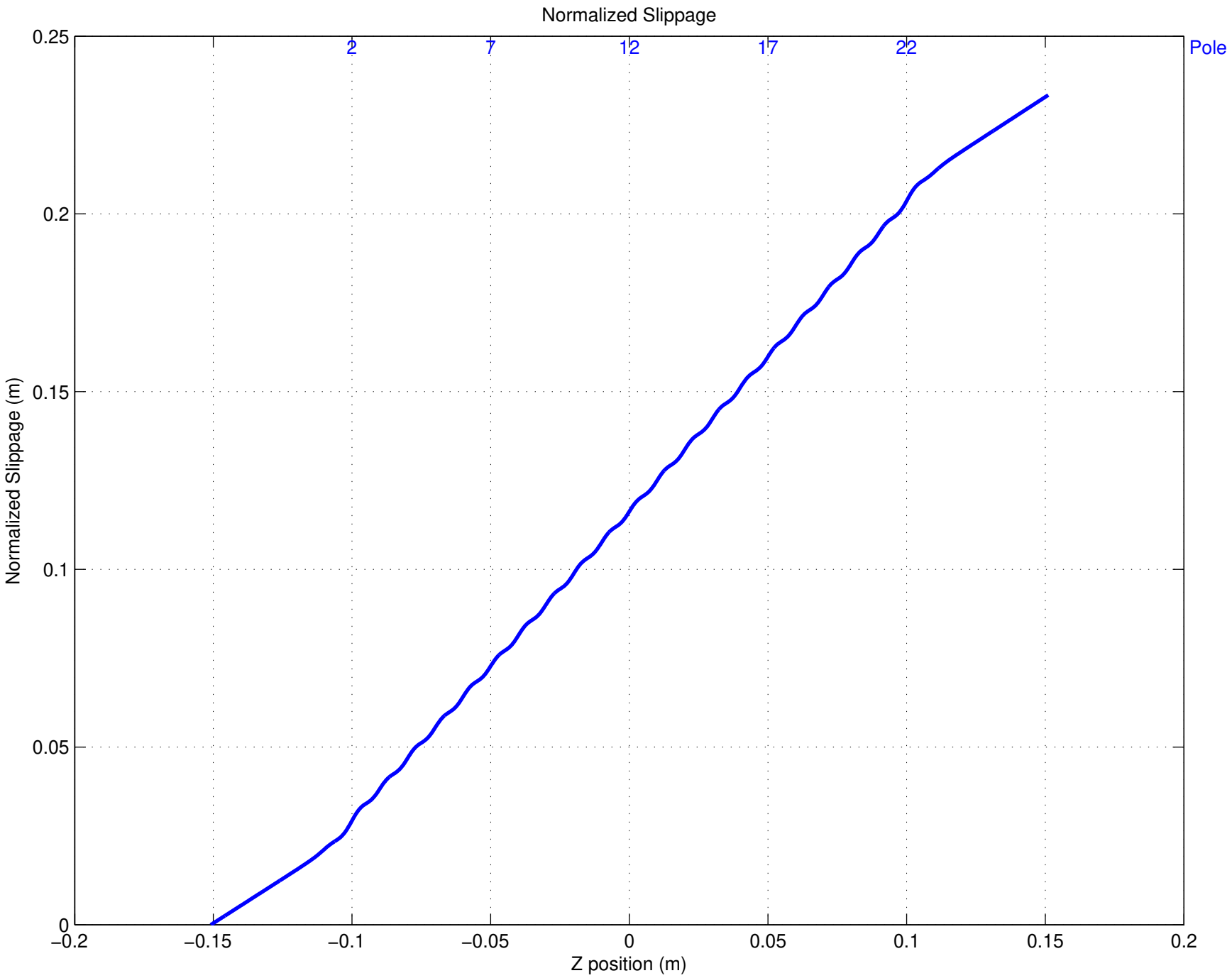

Y Trajectory
x 10^-4
0
−0.2
−0.4
−0.6
−0.8
−1
−1.2
Y (m)
2
7
12
17
22
Pole
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
Z position (m)

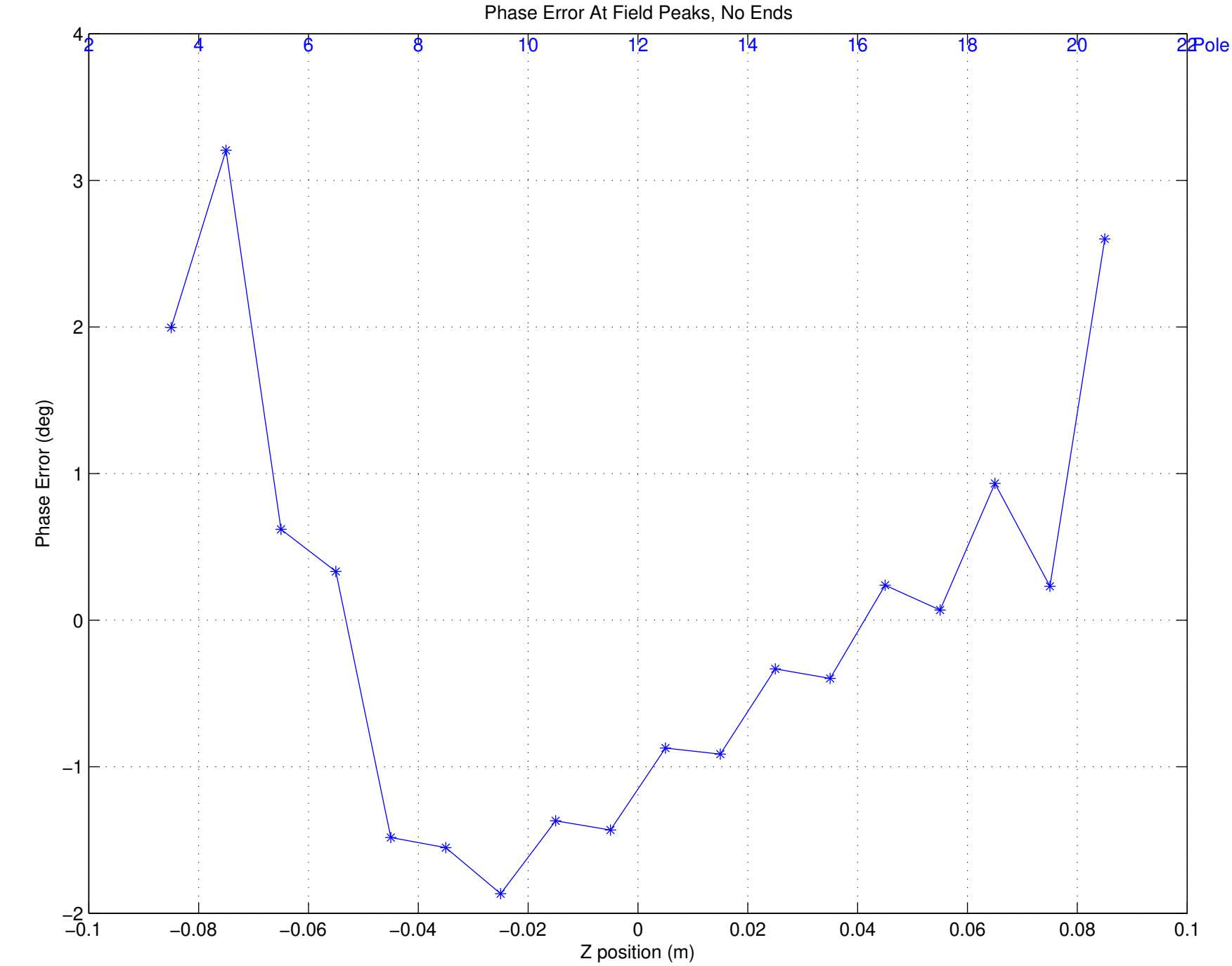

X Trajectory, Slope Corrected
x 10^-5
3
2
1
0
−1
−2
−3
2
7
12
17
22
Pole
X Trajectory, Corrected (m)
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
Z position (m)


Y Trajectory, Slope Corrected
x 10^-5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
2
7
12
17
22
Pole
Y Trajectory, Corrected (m)
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
Z position (m)

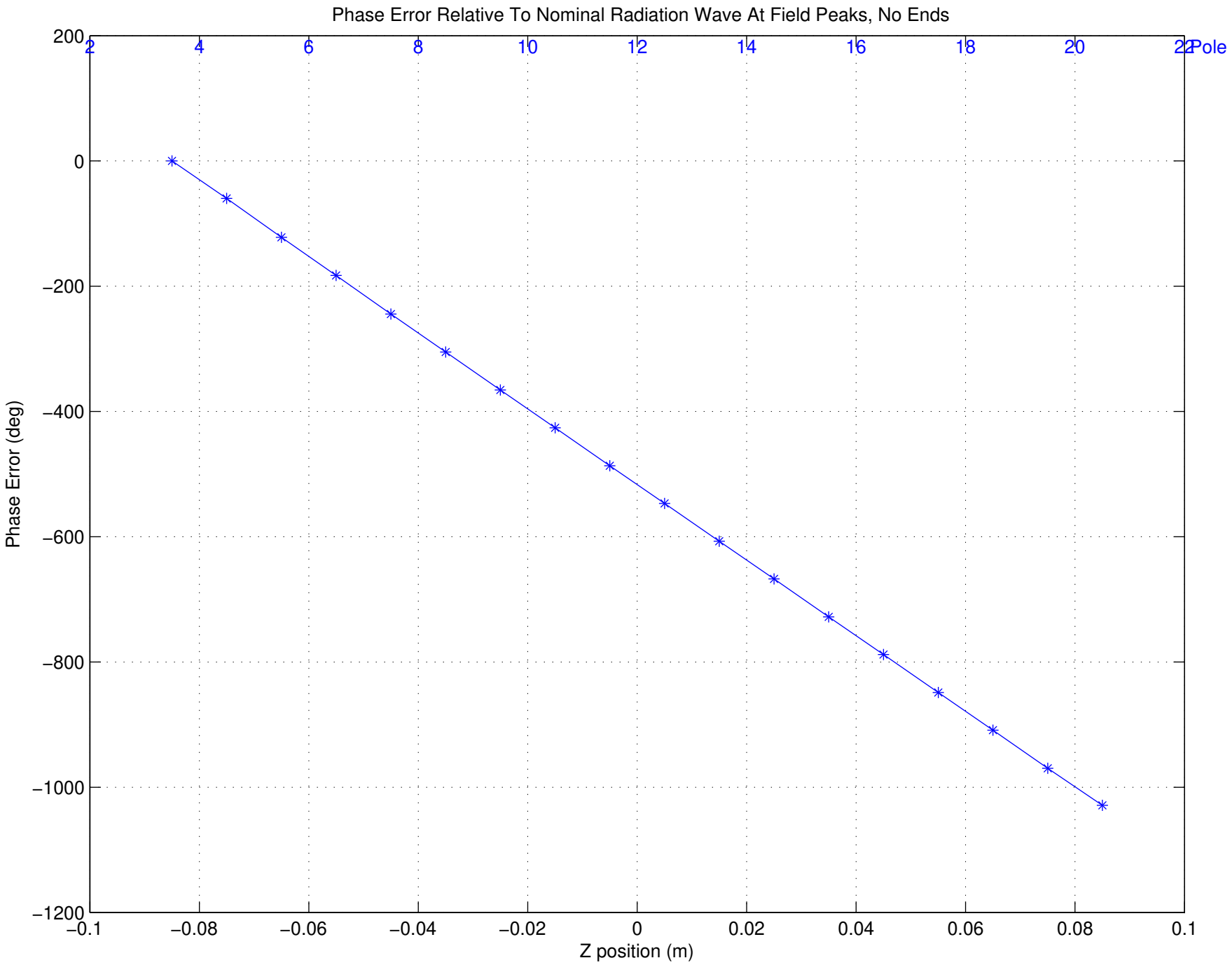

Slippage
x 10^-6
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Slippage (m)
2
7
12
17
22
Pole
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
Z position (m)


Slippage Residuals (Measured – Linear Fit) At Field Peaks, No Ends
x 10^-9
Slippage Residual (m)
Z position (m)
Pole
3
2.5
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−0.1
−0.08
−0.06
−0.04
−0.02
0
0.02
0.04
0.06
0.08
0.1
2
4
6
8
10
12
14
16
18
20
22


Normalized Slippage
2
7
12
17
22
Pole
0.25
0.2
0.15
0.1
0.05
0
Normalized Slippage (m)
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
Z position (m)



Phase Error: Ave = −0.000000 deg, RMS = 1.462665 deg


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
Pole
2
4
6
8
10
12
14
16
18
20
22
200
0
−200
−400
−600
−800
−1000
−1200
Phase Error (deg)
−0.1
−0.08
−0.06
−0.04
−0.02
0
0.02
0.04
0.06
0.08
0.1
Z position (m)